IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) An ion source comprising:

a plasma production vessel which serves as an anode;

a filament provided on one side of said plasma production vessel;

a reflector provided opposite said filament on the other side of said plasma production vessel and kept at a filament potential or a floating potential; and

a magnet for generating a magnetic field in a direction of connecting said filament and said reflector within said plasma production vessel,

wherein a relation

$L < 3.37B^{-1}\sqrt{(V_A)} \times 10^{-6}$

is satisfied, where the arc voltage applied between said plasma production vessel and said filament is V_A[V], the magnetic flux density of the magnetic field within said plasma production vessel is B[T], and the shortest distance from a most frequent electron emission point located almost at the tip center of said filament to a wall face of the plasma production vessel is L[m], wherein the magnetic field is configured to cause electrons produced by the plasma production vessel above an energy level to collide with the wall face.

2. (Original) The ion source according to claim 1, wherein the ion source is a Bernus type.

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

3. (Original) The ion source according to claim 1, wherein said magnet is an electromagnet or a permanent magnet.

4. (Currently Amended) A method for operating an ion source which comprises a plasma production vessel serving as an anode, a filament provided on one side of said plasma production vessel, a reflector provided opposite said filament on the other side of said plasma production vessel and kept at a filament potential or a floating potential, and a magnet for generating a magnetic field in a direction of connecting said filament and said reflector within said plasma production vessel, the method comprising a step of leading out an ion beam with the following relation being satisfied,

$$L < 3.37B^{-1}\sqrt{(V_A)} \times 10^{-6}$$

where an arc voltage applied between said plasma production vessel and said filament is V_A[V], a magnetic flux density of the magnetic field within said plasma production vessel is B[T], and a shortest distance from a most frequent electron emission point located almost at the tip center of said filament to a wall face of said plasma production vessel is L[m], wherein the magnetic field is configured to cause electrons produced by the plasma production vessel above an energy level to collide with the wall face.

5. (Original) The method according to claim 4, wherein the ion source is a Bernus type.

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

6. (Original) The method according to claim 4, wherein said magnet is an electromagnet or a permanent magnet.

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GARRETT &
DUNNER LLP

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Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com